

CLAIMS:

Sub A1
1. Surface-modified, pyrogenically produced oxides doped by aerosol.
2. Surface-modified, pyrogenically produced oxides doped by aerosol, characterized in that the oxides are oxides from the group SiO_2 , Al_2O_3 , TiO_2 , B_2O_3 , ZrO_2 , In_2O_3 , ZnO , Fe_2O_3 , Nb_2O_5 , V_2O_5 , WO_3 , SnO_2 , GeO_2 .

3. Surface-modified, pyrogenically produced oxides doped by aerosol in accordance with claim 1 or 2, characterized in that they are surface-modified with one or several compounds from the following groups:

a) Organosilanes of the type $(\text{RO})_3\text{Si}(\text{C}_n\text{H}_{2n+1})$ and $(\text{RO})_3\text{Si}(\text{C}_n\text{H}_{2n-1})$

R = alkyl

n = 1 - 20

b) Organosilanes of the type $\text{R}'_x(\text{RO})_y\text{Si}(\text{C}_n\text{H}_{2n+1})$ and $(\text{RO})_3\text{Si}(\text{C}_n\text{H}_{2n+1})$

R = alkyl

R' = alkyl

R' = cycloalkyl

N = 1 - 20

Sub A1
cont.

$$x+y=3$$

$$x=1, 2$$

$$y=1, 2$$

c) Halogen organosilanes of the type $X_3 \text{Si}(\text{C}_n\text{H}_{2n+1})$ and $X_3 \text{Si}(\text{C}_n\text{H}_{2n-1})$

$$X = \text{Cl, Br}$$

$$n = 1 - 20$$

d) Halogen organosilanes of the type $X_2 (\text{R}') \text{Si}(\text{C}_n\text{H}_{2n+1})$ and

$$X_2 (\text{R}') \text{Si}(\text{C}_n\text{H}_{2n-1})$$

$$X = \text{Cl, Br}$$

$$\text{R}' = \text{alkyl}$$

$$\text{R}' = \text{cycloalkyl}$$

$$n = 1 - 20$$

e) Halogen organosilanes of the type $X (\text{R}')_2 \text{Si}(\text{C}_n\text{H}_{2n+1})$ and

$$X (\text{R}')_2 \text{Si}(\text{C}_n\text{H}_{2n-1})$$

$$X = \text{Cl, Br}$$

$$\text{R}' = \text{alkyl}$$

$$\text{R}' = \text{cycloalkyl}$$

$$n = 1 - 20$$

f) Organosilanes of the type $(\text{RO})_3\text{Si}(\text{CH}_2)_m\text{R}'$

Subst.
cont.

$R = \text{alkyl}$

$m = 0.1 - 20$

$R' = \text{methyl-, aryl (e.g., } -C_6H_5, \text{ substituted phenyl groups)}$

$-C_4F_9, OCF_2-CHF-CF_3, -C_6F_{13}, -O-CF_2-CHF_2$

$-NH_2, =N_3, -SCN, -CH=CH_2, -NH-CH_2-CH_2-NH_2,$

$-N-(CH_2-CH_2-CH_2NH_2)_2$

$-OOC(CH_3)_c = CH_2$

$-OCH_2-CH(O)CH_2$

$-NH-CO-N-CO-(CH_2)_5$

$-NH-COO-CH_3, -NH-COO-CH_2-CH_3, -NH-(CH_2)_3Si(or)_3$

$-S_x-(CH_2)_3Si(OR)_3$

$-SH$

$-NR'R''R'''$ ($R' = \text{alkyl, aryl; } R'' = H, \text{ alkyl, aryl; } R''' = H, \text{ alkyl, aryl, benzyl, } C_2H_4NR'''' R'''''$ with $R'''' = A, \text{ alkyl and } R'''' = H, \text{ alkyl}$)

g) Organosilanes of the type $(R'')_x (RO)_y Si(CH_2)_m - R'$

$R'' = \text{alkyl}$

$x+y = 2$

$= \text{cycloalkyl}$

$x = 1, 2$

$y = 1, 2$

$m = 0.1 \text{ to } 20$

$R' = \text{methyl-, aryl (e.g., } -C_6H_5, \text{ substituted phenyl groups)}$

$-C_4F_9, -OCF_2-CHF-CF_3, -C_6F_{13}, -O-CF_2-CHF_2$

Sub A1
cont.

$-\text{NH}_2$, $-\text{N}_3$, SCN , $-\text{CH}=\text{CH}_2$, $-\text{NH}-\text{CH}_2-\text{CH}_2-\text{NH}_2$,
 $-\text{N}(\text{CH}_2-\text{CH}_2-\text{NH}_2)_2$
 $-\text{OOC}(\text{CH}_3)\text{C}=\text{CH}_2$
 $-\text{OCH}_2-\text{CH}(\text{O})\text{CH}_2$
 $-\text{NH}-\text{CO}-\text{N}-\text{CO}-(\text{CH}_2)_5$
 $-\text{NH}-\text{COO}-\text{CH}_3$, $-\text{NH}-\text{COO}-\text{CH}_2-\text{CH}_3$, $-\text{NH}-(\text{CH}_2)_3\text{Si}(\text{OR})_3$
 $-\text{S}_x-(\text{CH}_2)_3\text{Si}(\text{OR})_3$
 $-\text{SH}$
 $-\text{NR}'\text{R}''\text{R}'''$ ($\text{R}' = \text{alkyl, aryl}$; $\text{R}'' = \text{H, alkyl, aryl}$; $\text{R}''' = \text{H, alkyl, aryl, benzyl}$,
 $\text{C}_2\text{H}_4\text{NR}''''\text{R}'''''$ with $\text{R}'''' = \text{A, alkyl}$ and
 $\text{R}''''' = \text{H, alkyl}$)

h) Halogen organosilanes of the type $\text{X}_3\text{Si}(\text{CH}_2)_m-\text{R}'$

$\text{X} = \text{Cl, Br}$

$m = 0, 1 - 20$

$\text{R}' = \text{methyl-}, \text{aryl (e.g., } -\text{C}_6\text{H}_5, \text{ substituted phenyl groups)}$

$-\text{C}_4\text{F}_9$, $-\text{OCF}_2-\text{CHF}-\text{CF}_3$, $-\text{C}_6\text{F}_{13}$, $-\text{O}-\text{CF}_2-\text{CHF}_2$
 $-\text{NH}_2$, $-\text{N}_3$, SCN , $-\text{CH}=\text{CH}_2$, $-\text{NH}-\text{CH}_2-\text{CH}_2-\text{NH}_2$,
 $-\text{N}(\text{CH}_2-\text{CH}_2-\text{NH}_2)_2$
 $-\text{OOC}(\text{CH}_3)\text{C}=\text{CH}_2$
 $-\text{OCH}_2-\text{CH}(\text{O})\text{CH}_2$
 $-\text{NH}-\text{CO}-\text{N}-\text{CO}-(\text{CH}_2)_5$

Sub A1
cont.

-NH-COO-CH₃, -NH-COO-CH₂-CH₃, -NH-(CH₂)₃Si(OR)₃
-S_x-(CH₂)₃Si(OR)₃
-SH

i) Halogen organosilanes of the type (R)X₂Si(CH₂)_m-R'

X = Cl, Br

R = alkyl such as methyl, - ethyl-, propyl-

m = 0, 1 - 20

R' = methyl-, aryl (e.g., -C₆H₅, substituted phenyl groups)

-C₄F₉, -OCF₂-CHF-CF₃, -C₆F₁₃, -O-CF₂-CHF₂

-NH₂, -N₃, SCN, -CH=CH₂, -NH-CH₂-CH₂-NH₂,

-N-(CH₂-CH₂-NH₂)₂

-OOC (CH₃)C = CH₂

-OCH₂-CH(O) CH₂

-NH-CO-N-CO-(CH₂)₅

-NH-COO-CH₃, -NH-COO-CH₂-CH₃, -NH-
(CH₂)₃Si(OR)₃

-S_x-(CH₂)₃Si(OR)₃

-SH

(j) Halogen organosilanes of the type (R)₂X Si(CH₂)_m-R'

X = Cl, Br

R = alkyl

SubA21
cont.

$m = 0, 1 - 20$

$R =$ methyl-, aryl (e.g., $-C_6H_5$, substituted phenyl groups)

$-C_4F_9$, $-OCF_2-CHF-CF_3$, $-C_6F_{13}$, $-O-CF_2-CHF_2$

$-NH_2$, $-N_3$, SCN , $-CH=CH_2$, $-NH-CH_2-CH_2-NH_2$,

$-N-(CH_2-CH_2-NH_2)_2$

$-OOC(CH_3)C=CH_2$

$-OCH_2-CH(O)CH_2$

$-NH-CO-N-CO-(CH_2)_5$

$-NH-COO-CH_3$, $-NH-COO-CH_2-CH_3$, $-NH-(CH_2)_3Si(OR)_3$

$-S_x-(CH_2)_3Si(OR)_3$

$-SH$

(k) Silazanes of the type $R'R_2Si-N-SiR_2R'$

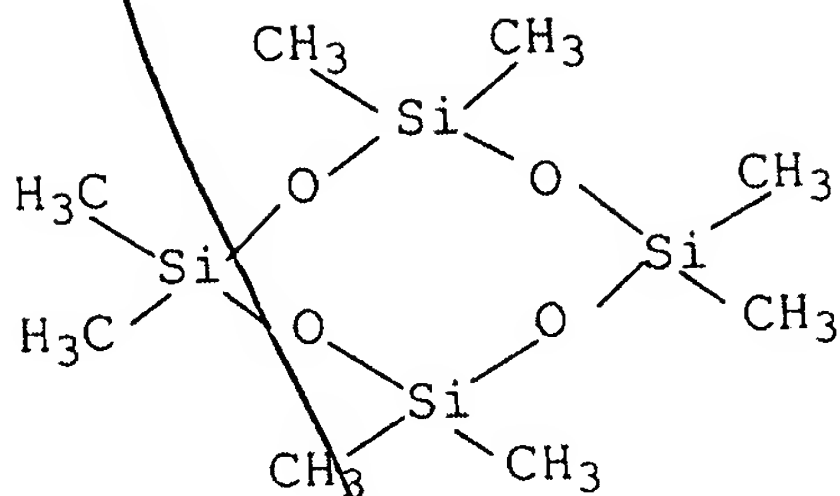
H

$R =$ alkyl

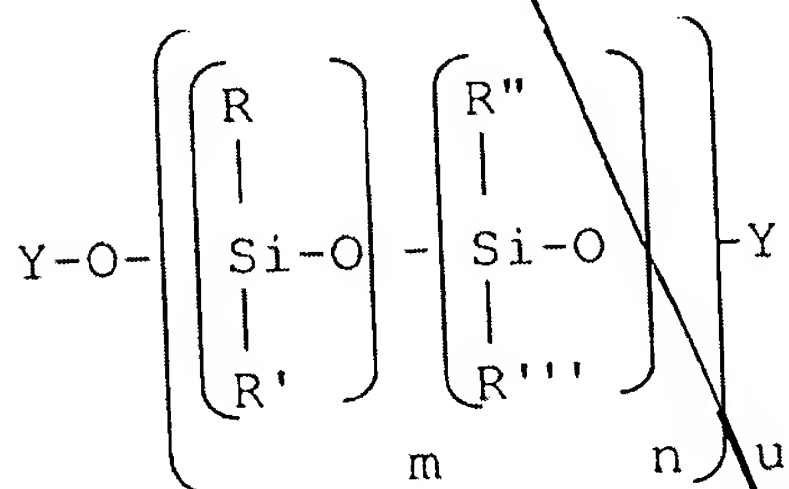
$R' =$ alkyl, vinyl

(l) Cyclic polysiloxanes of the type D 3, D 4, D 5, e.g.
octamethylcyclotetrasiloxane = D4

Sub A2
cont.



m) Polysiloxanes or silicone oils of the type



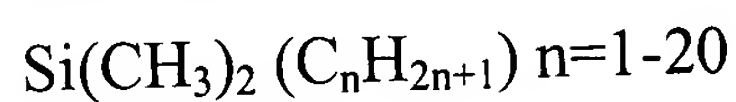
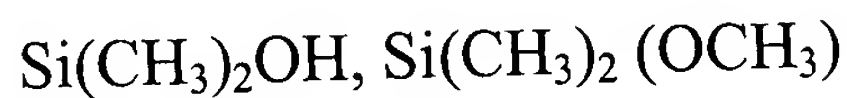
$$m = 0, 1, 2, 3, \dots \infty$$

$$n = 0, 1, 2, 3, \dots \infty$$

$$u = 0, 1, 2, 3, \dots \infty$$

$$Y = CH_3, H, C_nH_{2n+1} \quad n=1-20$$

$$Y = Si(CH_3)_3, Si(CH_3)_2H$$



R = alkyl, aryl, $(CH_2)_n-NH_2$, H

R' = alkyl, aryl, $(CH_2)_n-NH_2$, H

R'' = alkyl, aryl, $(CH_2)_n-NH_2$, H

R''' = alkyl, aryl, $(CH_2)_n-NH_2$, H

Sub A1
cont.

4. A method of producing the surface-modified oxides in accordance with claim 1 or 2, characterized in that pyrogenically produced oxides doped by aerosol are placed in a suitable mixing container, the oxides are sprayed under intensive mixing, optionally with water and/or acid at first and subsequently with a surface-modification reagent or a mixture of several surface-modification reagents, optionally re-mixed 15 to 30 minutes and tempered at a temperature of 100 to 400 °C for a period of 1 to 6 hours.

5. The use of the surface-modified oxides as reinforcing filler.

Add A2